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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Patent Application

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Inventor(s): Yuhai Mao and C.Y. Chu

Title: STANDALONE VIDEO CD-ROM SWITCHING METHOD AND SYSTEM

The Commissioner of Patents and Trademarks
Washington, D.C. 20231
Sir:

Transmittal of a Patent Application
(Under 37 CFR §1.53)

Transmitted herewith is the above identified patent application, including:

- ☒ Specification, claims and abstract, totaling 19 pages.
- ☐ Formal drawings, totaling pages.
- ☒ Informal drawings, totaling 6 pages.
- ☒ Declaration and Power of Attorney.
- ☐ Information Disclosure statement.
- ☐ Form 1449
- ☒ Assignment(s)
- ☒ Assignment Recordation Form (duplicate)
- ☐ Preliminary Amendment

Other:

FEES DUE

The fees due for filing the specification pursuant to 37 C.F.R. § 1.16 and for recording of the Assignment, if any, are determined as follows:

CLAIMS					
	NO. OF CLAIMS		EXTRA CLAIMS	RATE	FEES
Basic Application Fee					\$790.00
Total Claims	15	Minus 20=	0	X \$22 =	\$0.00
Independent Claims	3	Minus 3=	0	X \$82 =	\$0.00
If multiple dependent claims are presented, add \$270.00					\$0.00
Add Assignment Recording Fee of \$40.00 If Assignment document is enclosed					\$40.00
TOTAL APPLICATION FEE DUE					\$830.00

PAYMENT OF FEES

The full fee due in connection with this communication is provided as follows:

1. Not enclosed
 - ☐ No filing fee is to be paid at this time.
2. Enclosed
 - ☒ Filing fee
 - ☒ Recording assignment
 - ☐ Petition fee for filing by other than all the inventors or person on behalf of the inventor where inventor refused to sign or cannot be reached
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 - ☒ The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No.: 23-0085. A duplicate copy of this authorization is enclosed.
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 - ☐ Charge any fees required or credit any overpayments associated with this filing to Deposit Account No.: 23-0085.

This application is filed pursuant to 37 C.F.R. § 1.53 in the name of the above-identified Inventor(s).

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- ☒ This transmittal ends with this page.

Respectfully submitted,

Date: 6/12/98

By: 

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UNITED STATES PATENT APPLICATION

FOR

STANDALONE VIDEO CD-ROM SWITCHING METHOD AND SYSTEM

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STANDALONE VIDEO CD-ROM SWITCHING METHOD AND SYSTEM

FIELD OF THE INVENTION

The present claimed invention relates to the field of video CD-ROM.

- 5 More particularly, the present claimed invention relates to switching between browser and video modes in a standalone video CD-ROM system.

BACKGROUND ART

- In recent past, the compact disk read-only-memory (CD-ROM)
- 10 technology has profoundly transformed the way video and audio are stored and disseminated. On the audio front, the audio CD-ROM technology has made phonograph an obsolete technology. In the video field, the video CD-ROM technology is rapidly making inroads into the arena previously occupied by traditional video tape technology as video CD-ROMs (e.g.,
- 15 multimedia CD-ROM disks, karaoke CD-ROM disks, DVDs, etc.) are becoming increasingly popular. In particular, the Video CD-ROM technology offers more efficient access and portability over the traditional video tape.

- In order to facilitate migration to CD-ROM technologies, the Moving
- 20 Photographic Expert Group (MPEG) has set up several well known standards for compression of digital audio and video transmission at various bit rates. In particular, MPEG-1 standard was developed for storing and distributing video and audio, with emphasis on video quality. MPEG-1 facilitates coding of video for digital storage media such as CD-ROM at rates of 1 to 1.5 Megabits
- 25 per second (Mb/s). In addition to forward playback, some features of MPEG-1 include random access, fast forward, and reverse playback. This standard is widely used for storing and distributing video CDs and many video games.

Today, due in large part to these advantages, the CD-ROM technology has been widely incorporated into personal computers. Indeed, the majority of personal computers sold today include a CD-ROM drive of one type or another. This incorporation of the CD-ROM technology in computer systems has largely coincided with the popularity of multimedia applications containing text, graphics, images, audio, video, etc. For instance, the multimedia marketplace is replete with various educational and entertainment CD-ROM disks that allow a user to browse the contents of the disks interactively. These disks typically contain a menu or a browser that enable the user to interactively browse or navigate through the contents of the disks in a nonsequential manner.

Unfortunately, the multimedia CD-ROM disks typically require a computer system equipped with a CD-ROM drive (i.e., player) to browse and playback the contents. Even today, a typical low-end computer costs around \$1,000. Hence, a user without a computer must invest a substantial amount of money to be able to use the multimedia CD-ROM disks.

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A standalone Video CD player, on the other hand, usually costs less than \$200 in today's market and plays the contents of a VCD or CD disk directly on a TV set or a stereo system. For example, the conventional audio CD player plays audio CD-ROM disks to a stereo system and conventional video CD player (e.g., karaoke player, video CD player, DVD player, etc.) plays video CDs directly onto a standard TV.

Although standalone CD-ROM system connected to a TV plays CD-ROM disks containing only video with little trouble, playing back the content of a CD-ROM disk multimedia disk has posed more of a challenge. For example, while browsing the disk in a browser mode (e.g., text, browser, menu, etc.), a user may choose to play a video clip. However, playing a video such as movies and video clips generally requires a large bandwidth and resources. In particular, in a standalone CD-ROM system without the processing resources of a full computer system, playing a video clip typically requires that an MPEG decoder have exclusive access to the resources in the system such as memory (e.g., random access memory). In the inexpensive standalone CD-ROM system with limited resources, the MPEG decoder's monopoly of the resources typically displaces the content of the memory including the addresses and data associated with the original browser mode.

Thus, what is needed is a method and system for returning to the original browser (e.g., browser, menu, etc.) mode after playing a video in a standalone CD-ROM system. The present invention satisfies these needs by providing a method that switches between the browser and video modes in a standalone CD-ROM system.

SUMMARY OF THE INVENTION

The present invention provides a method and system for switching between browser and video modes in a standalone video CD-ROM (VCD-ROM) system. Data segments of browser program and video program are first
5 loaded into a memory unit in the system and the code of browser program is executed on the ROM unit in the standalone system. The browser program allows a user to navigate through the content of the VCD-ROM disk by selecting hypertext links. The hypertext links are selected by clicking on clickable text, buttons, and graphics. The system also allows the user to play a
10 video by selecting an associated hypertext link. When the video is selected, the present invention saves the return address and the address of the video, then removes the data segment of the browser program and executes the program of MPEG decoder. The video is then played on the video system. When the video is finished playing, the method of the present invention
15 reloads the data segment of the browser and executes the browser of the program. This returns the system to the original browser mode of the browser. By switching between the browser and video modes, the present invention saves memory otherwise required for maintaining both browser and video data segments in the video mode, and thus cost.

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BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and form a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention:

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Figure 1 illustrates a block diagram of a standalone VCD-ROM system.

Figure 2 illustrates a video CD player including a processor, MPEG decoder, a ROM, a RAM, a bus, and a controller.

Figure 3 illustrates a standalone video CD-ROM (VCD-ROM) system in accordance with the present invention.

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Figure 4 illustrates a memory map of an exemplary random access memory (RAM) 400 used to access program and data in the present invention.

Figure 5 illustrates a flow chart of the steps involved in switching between browser and video modes.

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Figure 6 illustrates more detailed steps involved in switching between browser and video modes in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following detailed description of the present invention, a standalone video CD-ROM switching method and system, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be obvious to one skilled in the art that the present invention may be practiced without these specific details. In other instances well known methods, procedures, components, and circuits have not been described in detail so as not to unnecessarily obscure aspects of the present invention.

The present invention provides a method and system for switching between browser and video modes in a standalone video CD-ROM (VCD-ROM) system, which can be attached to a TV for playback. The standalone VCD-ROM system is any standalone system that can attach to a TV for playing a VCD-ROM disk containing video and includes CD-ROM system, karaoke system, DVD system, etc. The present invention switches between browser and video modes by saving the return address of the browser mode and the address of the video in a reserved memory space. The rest of the memory is used in decoding the video. When the video is finished playing, the original browser mode is restored by reloading the return address and data segment to the browser mode. By switching between the browser and video modes, the present invention saves memory otherwise required for maintaining both browser and video modes, and thus cost.

Figure 1 illustrates a block diagram of a standalone VCD-ROM system 100. The VCD-ROM system 100 includes a VCD player, a VCD-ROM disk 104, an input device 106, and an optional display device 108 (e.g., TV, HDTV, etc.).

In response to an input signal from the input device 106, the VCD player 102 plays back the contents of a VCD-ROM disk 104 for audio-visual display on the display device 108. Although the present invention employs CD-ROM disks, it can also utilize rewritable or recordable CD-ROM disks.

5

Figure 2 illustrates a block diagram of a standalone VCD player 200, which couples to a TV (e.g., standard TV, HDTV, etc.) to play the contents of a VCD-ROM disk. The VCD player 200 can be any CD-ROM player that plays a video CD and includes traditional video CD-ROM player, karaoke player, DVD player, etc. The VCD player 200 comprises a processor 202, an MPEG decoder 204, a bus 206, a read-only-memory (ROM) 208, a random-access-memory (RAM) 210, and a controller 212. ROM 208 is used to store video and/or browser programs. The processor 202 is a general purpose programmable processor and executes programs such as a browser or search engine program. Since video and audio are typically encoded in accordance with MPEG standard, the MPEG decoder 204 decodes video and audio data streams and converts them into analog composite video signal for display on TV. The converted analog signal is then transmitted to a standard TV for viewing.

20

The controller 212 receives input signal from an input device such as an infrared remote control, a keypad, or a keyboard. In response to the information entered from the input device, the controller 212 decodes the input signal and transmits the decoded signals to the VCD player 200. For example, the decoded input signal may direct the read head of the VCD player 200 to a specified position to read a specific portion of the VCD-ROM disk.

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The VCD player 200 of the present invention includes two memory
units: a ROM 208 and a RAM 210. The ROM 208 stores a browser program,
browser data, a video program and video data. The RAM 210 is used to store
data from ROM 208 and VCD-ROM disk. The processor 202 and the MPEG
5 decoder 104 executes the programs in ROM 208 and data from the RAM 210.

The VCD player 200 of the present invention plays a special VCD-ROM
disk. In particular, the special VCD-ROM disk contains data. The data
includes text, graphics, images (e.g., GIF, JPEG, etc.), audio (e.g., MPEG-1), and
10 video (MPEG-1). The browser program enables a user to interactively browse
and play back in the VCD-ROM disk in a systematic manner. Data is stored in
the VCD-ROM disk as files and organized under a directory structure as is
well known in the art. It should be recognized that VCD-ROM disks include
disks containing video (e.g., movies, video clips, etc.) and as such may include
15 traditional CD-ROM disks, karaoke disks, DVD disks, etc.

When a VCD-ROM disk is first inserted into the VCD player 200 at
bootup, the VCD player 200 automatically executes the browser program and
loads data segments of video program and browser program into memory
20 (e.g., RAM). The browser program allows navigation and search through the
contents of the VCD-ROM disk in a manner substantially similar to the
today's typical web-browsers. That is, the browser program is accessed in a
hierarchy of pages, starting with a home page. Other pages are then accessed
through hyperlinks. Those skilled in the art will appreciate that browser
25 programs based on menus and search engines can also be structured in a
hierarchical order with hyperlinks.

engine and etc. When the VCD player 302 plays back a video from the VCD-ROM disk 304, the data segment of the browser program in the RAM is displaced by the video bitstream. This is because the MPEG decoder requires the RAM for decoding the video bitstream. After the video is played, the browser program is executed from the ROM, data segment of the browser program is reloaded back to RAM and data in VCD-ROM disk 304 will also be loaded upon returning from the video mode to browser mode. That is, the browser program is automatically loaded upon returning from playing a video stream. VCD-ROM disk 304 contains a video data segment 320, browser stack 321, and data segment 322 (e.g., HTML text, graphics, image and audio data).

In the present invention, the switch 310 for switching between the browser (e.g., browser, menu, search engine program, etc.) mode and the video (e.g., movie, video clip, etc.) mode is initiated by saving the return address to the browser mode and the address of the selected video into a reserved space in memory (e.g., RAM). The rest of the memory is used for loading data segments of programs, stack and other data. The video is then loaded into the memory and decoded by the MPEG decoder. The decoded video is then transmitted to a TV (e.g., standard TV, HDTV, etc.) for play. When the selected video is finished playing, data segment of the browser is reloaded and the original browser mode is restored by loading the browser mode indicated by the return address. In this manner, the return address of the original browser mode and the address of the selected video are saved securely in a reserved memory space for exclusive use in the switching process. In one embodiment, the switching mechanism of the present invention is stored in the VCD-ROM disk 304. In an alternative

embodiment, the switch 310 is stored in a read-only-memory (ROM) in the VCD player.

Besides data segment of the browser program being loaded into
5 memory at bootup, it is also loaded into the memory after playing a video clip. In this case, the present invention saves the return address, and the starting and ending addresses of the video clip. That is, when a user wishes to play a video clip, the user clicks a clickable button or text with a hyperlink to the video clip. The video system of the present invention then saves the
10 return address of the page to return to, which is a filename and a directory name in the VCD-ROM disk 304.

Figure 4 illustrates a memory map of an exemplary random access memory (RAM) 400 used to access program and data. In one embodiment,
15 the RAM 400 consists of 512K (kilobytes). Although the present invention uses 512K of memory, it can also utilize other memory sizes. The RAM 400 is used to hold data such as stack pointers 408, data 410, and user program data 414. In addition, the present invention stores the return address to the browser mode (i.e., the original browser page) and the address of a selected
20 video in a reserved offset 402 in the RAM 400 to allow switching between browser and video modes. The reserved offset 402 of 4K is further illustrated in a blowup view.

In the present invention, the small portion or offset 402 of the memory
25 is set aside exclusively for storing the return address to the browser mode 404 and the address of the selected video 406. According to one embodiment, the size of the portion or offset 402 of the memory exclusively reserved for such

purpose is 4K. It should be noted that even though the preferred embodiment of the present invention utilizes the first 4K of the memory as the reserved offset, the 4K offset can be chosen from any contiguous memory space. Although the memory size of 512K RAM with a 4K offset is described in the preferred embodiment, various other memory sizes and offsets are equally suitable for use in the present invention.

The reserved offset 402 of memory space is further subdivided into two halves of preferably 2K each. One half is reserved for storing the return address to the original browser mode 404. The other half stores the address of the selected video 406. According to the preferred embodiment of the present invention, the first half contains the return address 404 of the browser page by storing the filename and its associated directory name as stored in the VCD-ROM disk. The second half of the 4K offset is reserved for storing the starting and ending addresses of the selected video 406. In the alternative embodiment, the arrangement is reversed with the first half of the offset containing the address of the selected video and the second half of the offset containing the return address to the browser page.

Figure 5 illustrates a flow chart of the steps involved in switching between browser and video modes. A browser data segment is first loaded into a memory (e.g., RAM) in step 502. The browser program provides the browser mode and enables a user to navigate and browse the contents of the VCD-ROM disk. In the present invention, browser mode refers to all modes exclusive of video mode, which refers to the playing of video (e.g., movies, video clips, etc.). Then in step 504, a user selects a video to play. The present invention then switches from the browser mode to video mode in step 506.

In the video mode, the video is then played in step 508. After the video is played, the present invention returns to the original browser mode automatically at step 510. The process then terminates at step 512.

5 Figure 6 illustrates more detailed steps involved in switching between browser and video modes. When the user selects a video to play in the browser (e.g., browser, menu, etc.) mode, the present invention saves two types of information in step 602. First, the return filename corresponding to the displayed browser mode page is saved in a reserved portion of the
10 memory such as RAM. The return filename identifies the file stored in the VCD-ROM disk and thus serves as a return address to the browser mode page. In addition, the precise address of the selected video is saved and stored in the reserved portion of the memory. The address of the selected video is defined by the starting address and the ending address of the video in the VCD-ROM
15 disk. Both the starting and ending addresses are preferably defined by minute-second-frame (m-s-frame), which is a well known CD-ROM recording format.

 Then in step 604, the present invention plays the selected video.
20 When the selected video is finished playing, the present invention returns to the original browser mode page by loading the return file corresponding to the return filename and its directory as stored in the VCD-ROM disk in step 506. Since the filename of the original browser mode page and its associated directory were saved in a reserved portion of the memory, the original
25 browser mode (i.e., browser page) is restored. The process then terminates in step 508.

5 The switching method and system of the present invention saves memory in an inexpensive standalone VCD player. This is because the present invention allows only one mode to have access to the unreserved memory at a time. In particular, the MPEG decoder is allowed to use almost the entire memory space (i.e., RAM) for decoding a video stream during video mode, less memory is required. On the other hand, during the browser mode, the present invention allows full access to the memory by a browser or a menu program. In this manner, substantial savings in cost are realized.

10 The present invention, a VCD-ROM switching method and system, is thus described. While the present invention has been described in particular embodiments, it should be appreciated that the present invention should not be construed as being limited by such embodiments, but rather construed according to the claims below.

CLAIMS

What is claimed is:

1. A method for switching between browser mode and video mode
5 in a standalone CD-ROM system. The method comprising the steps of:
selecting, within the browser mode, a video for playback;
switching from the browser mode to a video mode;
playing the selected video in the video mode; and
returning to the browser mode to enable the user to resume browsing
10 the content of the CD-ROM disk.

2. The method as recited in Claim 1 wherein the switching step
further comprises the steps of:
reserving a portion of a memory;
15 storing a return address in the reserved portion of the memory; and
storing the starting and ending addresses of the video in the reserved
portion of the memory.

3. The method as recited in Claim 2 wherein the video CD-ROM
20 system plays the video from the starting address to the ending address.

4. The method as recited in Claim 1 wherein the returning step
further comprises the steps of:
reading the return address from the reserved portion of the memory;
25 and
loading a return file corresponding to the return address.

5. The method as recited in Claim 1 wherein the video is selected by a user in the browser mode.

6. A method for switching between browser and video modes in a standalone video CD-ROM system, the method comprising the steps of:

loading data segment of a browser program into a memory unit to enable a user to browse the content of a CD-ROM disk in the browser mode;

selecting a video to play within the browser mode;

switching from the browser mode to the video mode;

playing the selected video in the video mode; and

returning to the browser mode to enable the user to resume browsing the content of the CD-ROM disk.

7. The method as recited in Claim 6 wherein the switching step further comprises the steps of:

reserving a portion of a memory;

storing a return address in the reserved portion of the memory; and

storing the starting and ending addresses of the video in the reserved portion of the memory.

8. The method as recited in Claim 7 wherein the video CD-ROM system plays the video from the starting address to the ending address.

9. The method as recited in Claim 6 wherein the returning step further comprises the steps of:

reading the return address from the reserved portion of the memory;
5 loading data segment of the browser program: and loading a return file corresponding to the return address.

10. The method as recited in Claim 6 wherein the video is selected by a user in the browser mode.

10
11. A standalone video CD-ROM system comprising:
a video CD-ROM disk containing a browser program and data including text, graphics, images, audio, and video;
a means for browsing the video CD-ROM disk;
15 a video CD player for playing back the content of the video CD-ROM disk in first and second modes wherein the first mode plays back data excluding video and the second mode plays back video only;
a means for selecting a video to play back; and
a means, responsive to the selecting means, for switching from the first
20 mode to the second mode to play back the video and then back to the first mode.

12. The video CD-ROM system as recited in Claim 11 wherein the first mode is a browser mode and the second mode is a video mode.

13. The video CD-ROM system as recited in Claim 12 wherein the switching means further comprises:

a means for reserving a portion of a memory;

5 a means for storing a return address in the reserved portion of the memory; and

a means for storing the starting and ending addresses of the selected video in the reserved portion of the memory.

10 14. The video CD-ROM system as recited in Claim 13 further comprising the steps of:

reading the return address from the reserved portion of the memory; and loading a return file corresponding to the return address.

15 15. The method as recited in Claim 11 wherein the video is selected by a user.

ABSTRACT

The present invention provides a method and system for switching between browser and video modes in a standalone VCD-ROM system including a VCD player and a VCD-ROM disk. A browser program is first
5 executed in the VCD-ROM system. The browser program allows a user to navigate through the content of the VCD-ROM disk by selecting hypertext links. The hypertext links are selected by clicking on clickable text, buttons, and graphics. The system also allows the user to play a video by selecting an associated hypertext link. When the video is selected, the method of the
10 present invention saves the return address and the address of the video. The video is then played on the video system. When the video is finished playing, the method of the present invention reloads the return address into the system. This returns the system to the original browser mode of the browser.

15

100

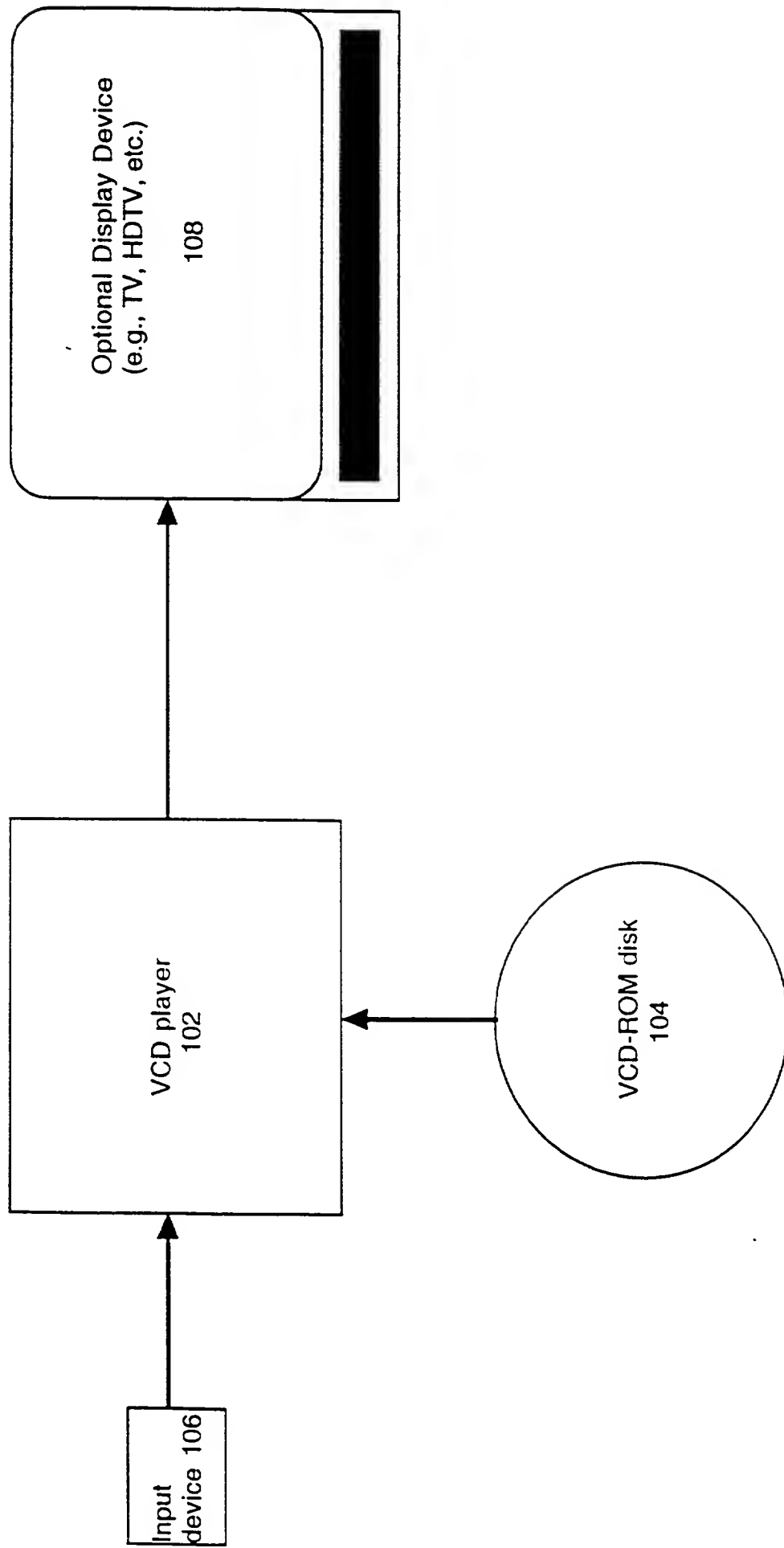


FIG. 1

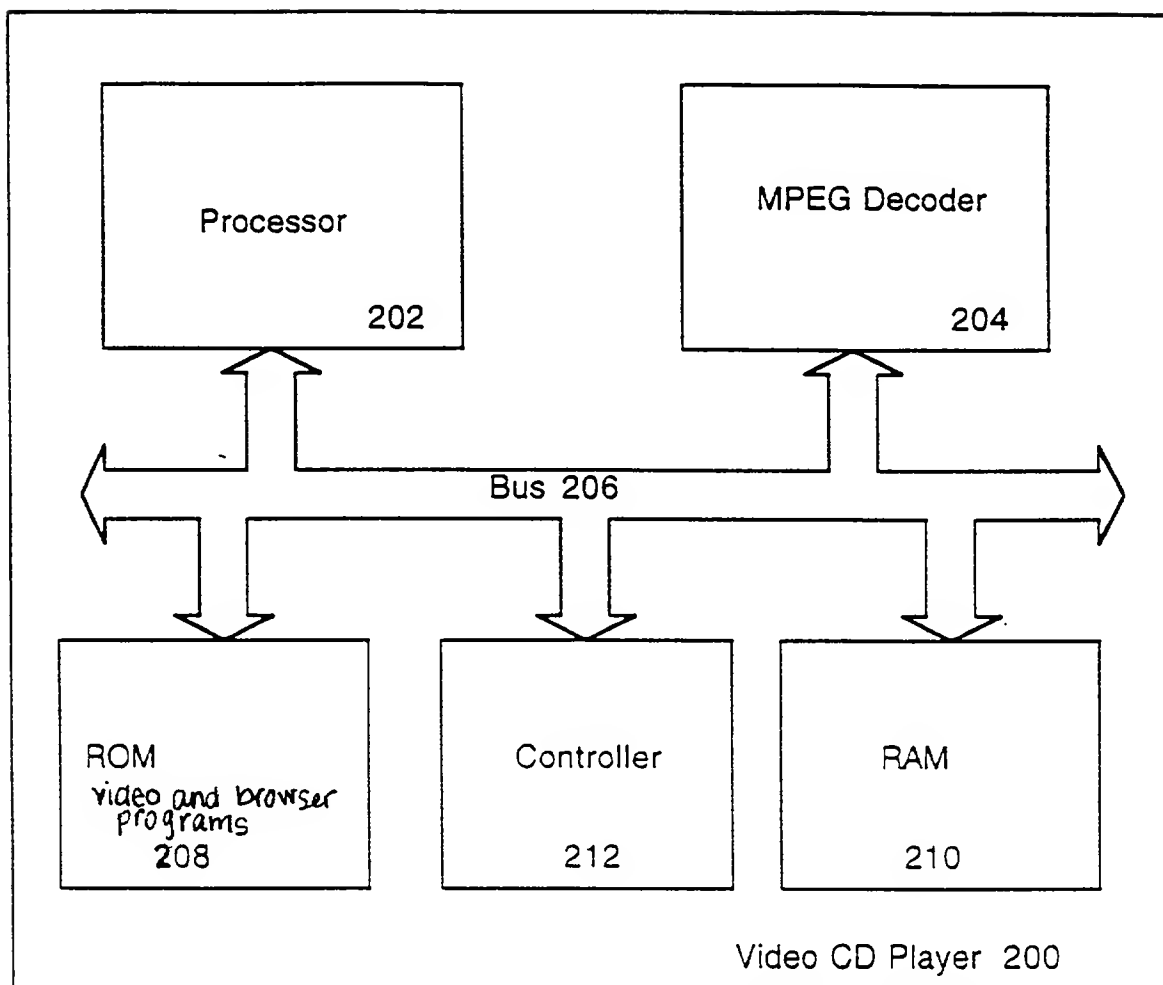


FIG. 2

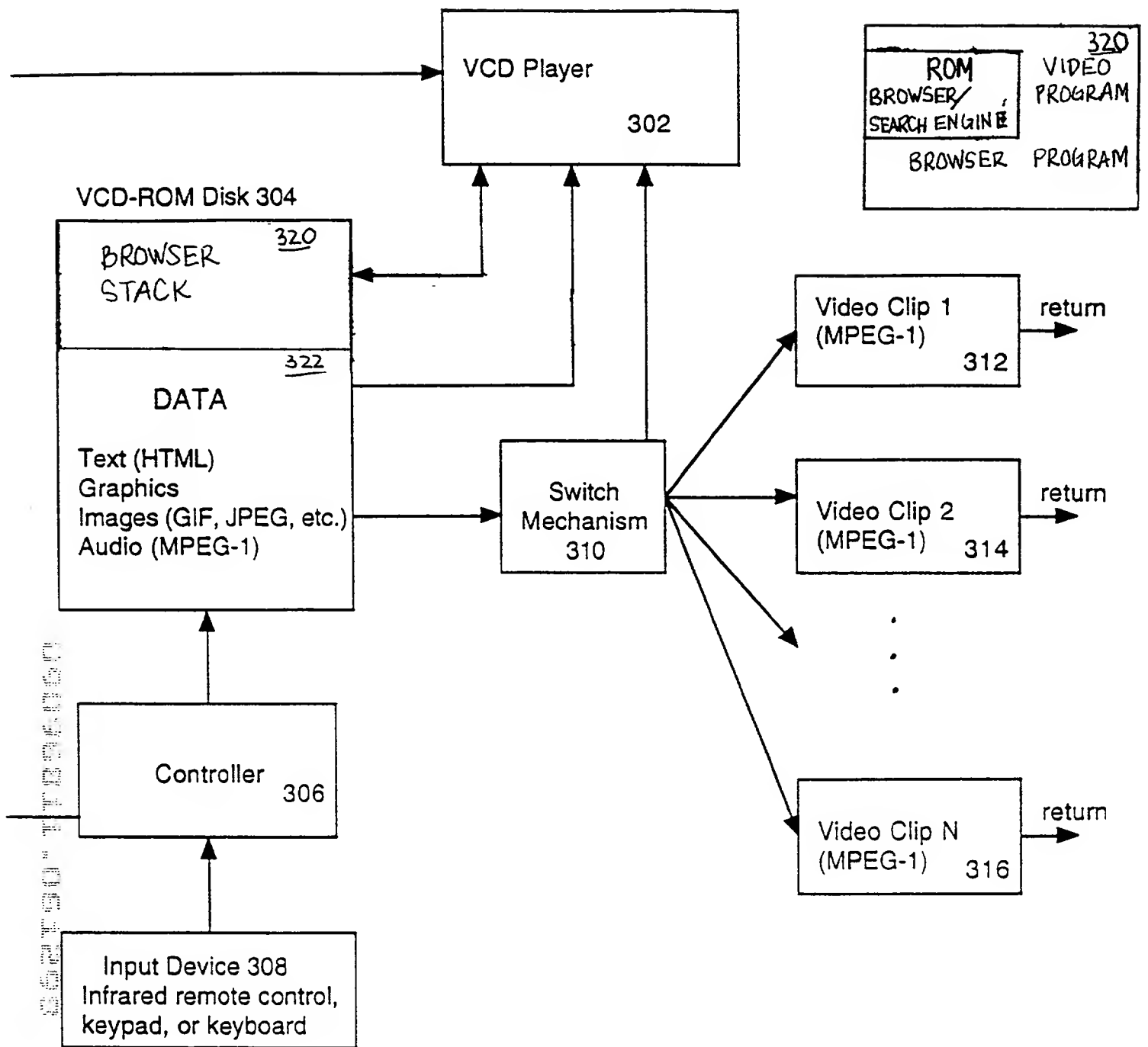


FIG. 3

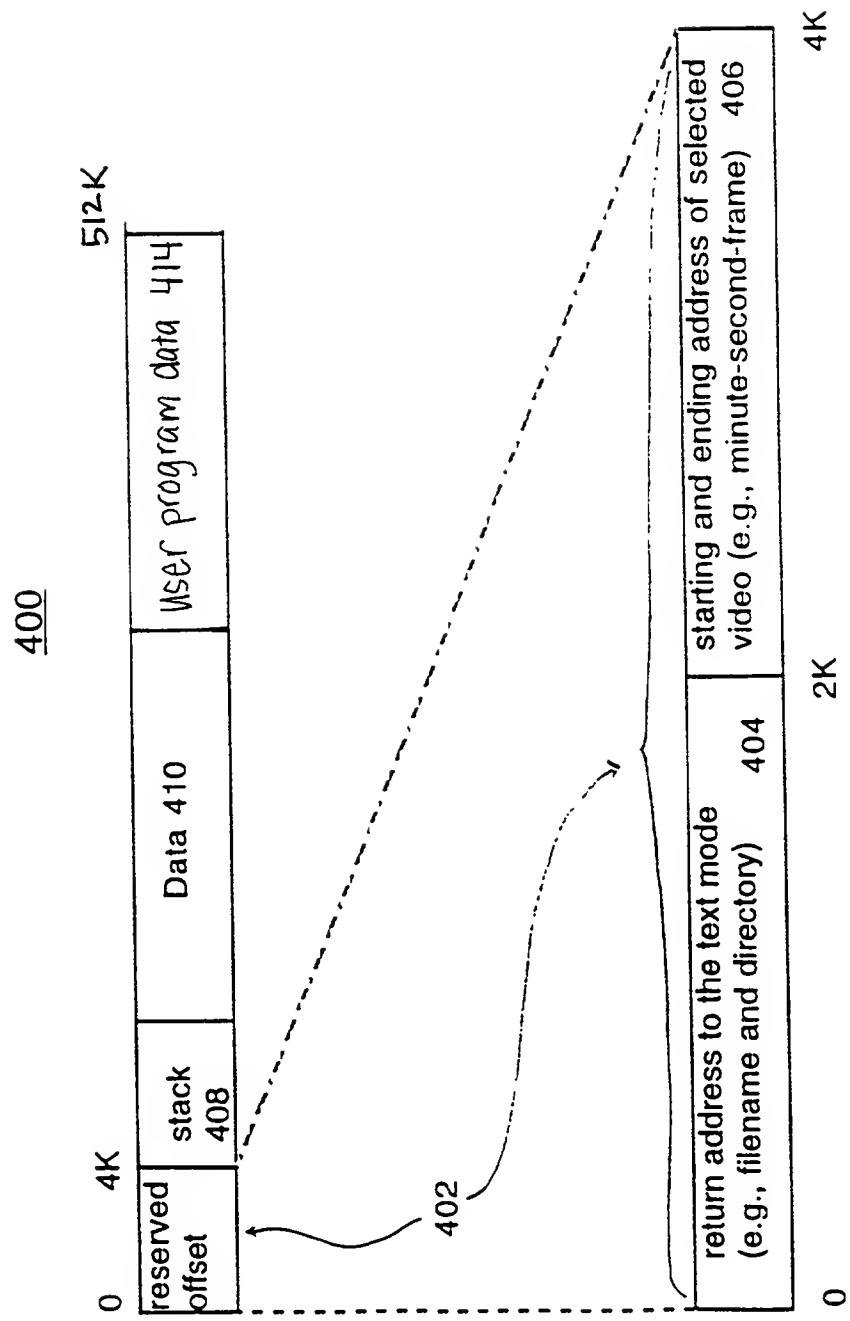


FIG. 4

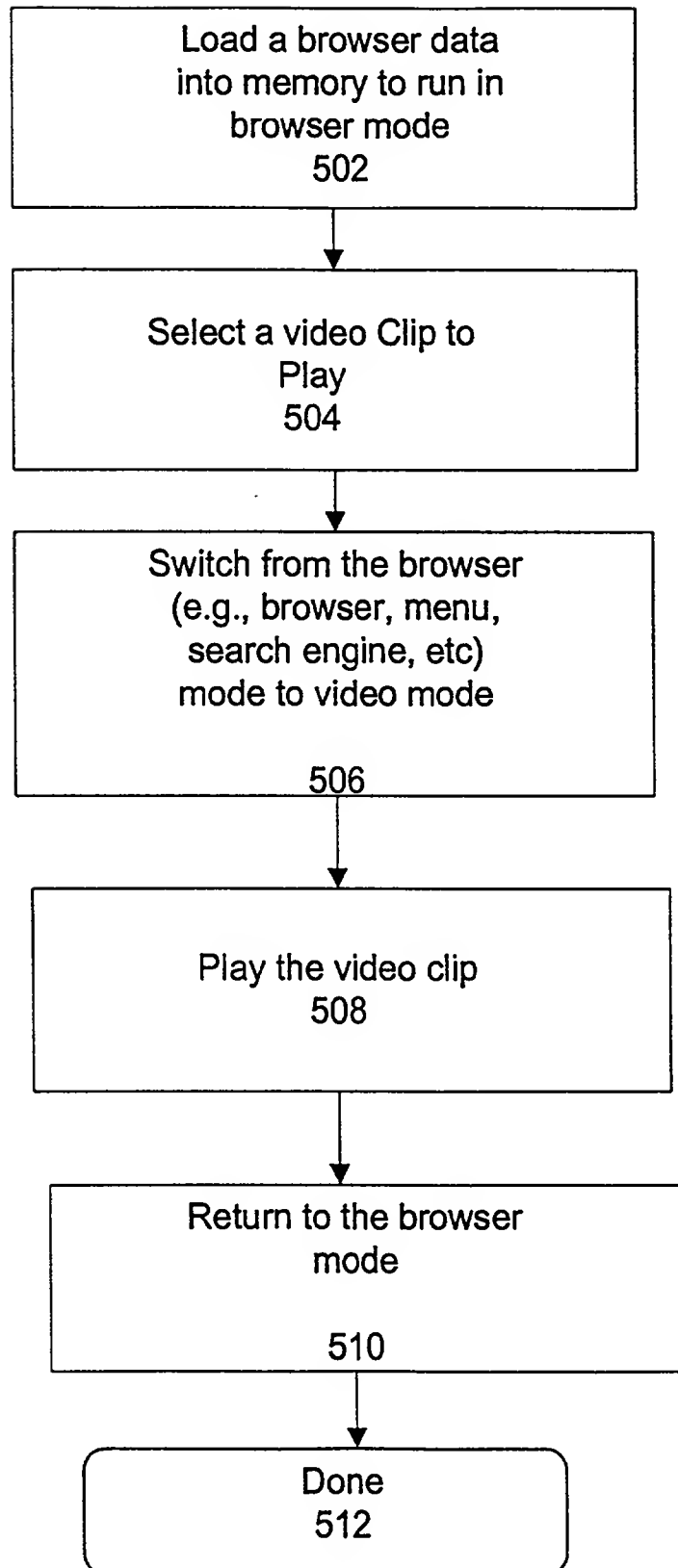


FIG. 5

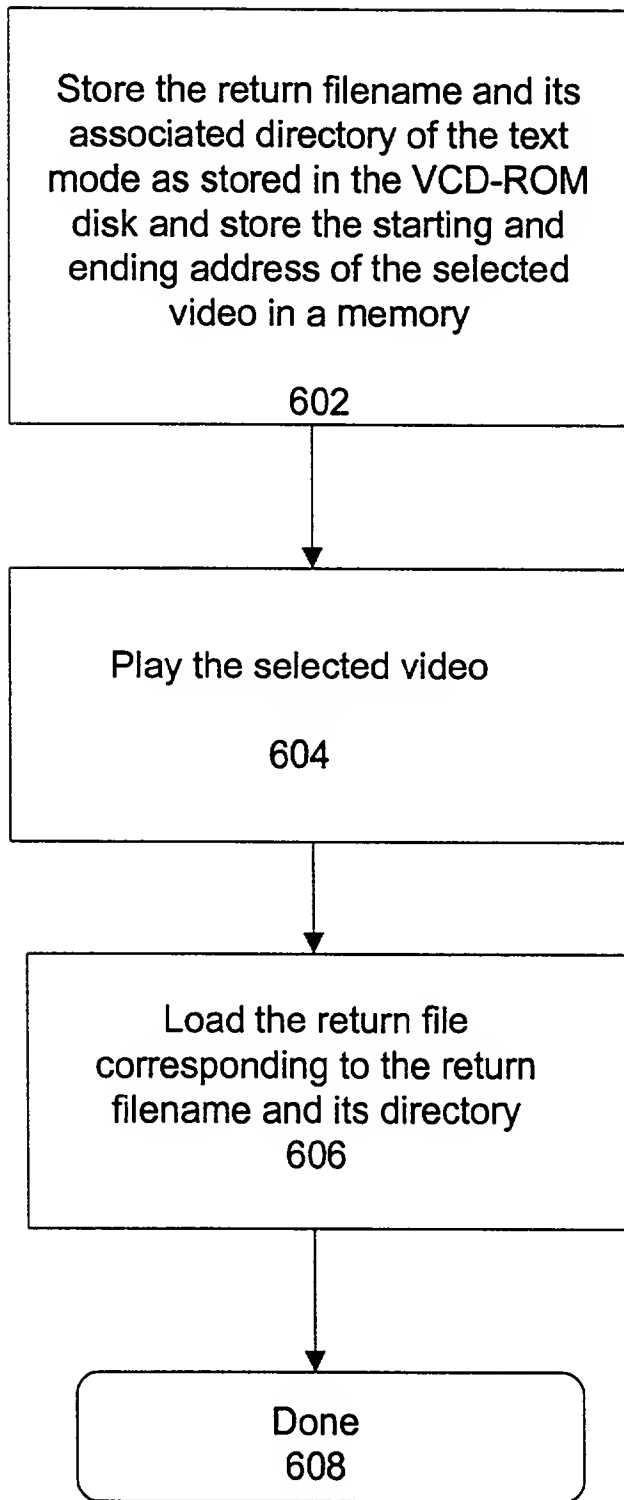


FIG. 6

Declaration

STANDALONE VIDEO CD-ROM SWITCHING METHOD AND SYSTEM

X is attached hereto, or
 was filed on _____ as application serial no. _____ : and
 was amended on _____

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Number	Country	Date Filed	Priority Claimed
.....	yes
.....	yes

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Serial Number	Filing Date	Status (patented/pending/abandoned)
.....
.....

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Designer and sales company:
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Power of Attorney

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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